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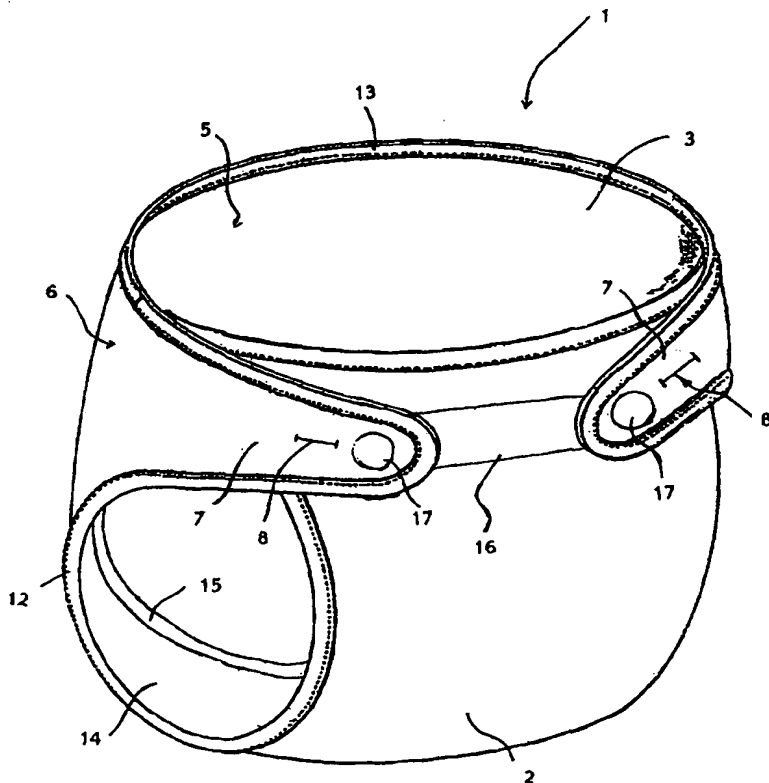
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(21) International Application Number: PCT/CZ98/00020 (22) International Filing Date: 28 April 1998 (28.04.98) (30) Priority Data: PUV 6619-97 28 April 1997 (28.04.97) CZ (71)(72) Applicant and Inventor: MORÁVEK, Zdeněk [CZ/CZ]; Svatopluka Čecha 678, 551 01 Jaroměř (CZ). (74) Agent: PATENTSERVIS PRAHA A.S.; Jívenská 1/1273, 140 00 Praha 4 (CZ).		(81) Designated States: AT, AT (Utility model), CH, DE, DE (Utility model), HU (Utility model), PL (Utility model), SK, SK (Utility model), UA (Utility model).  <b>Published</b> <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>

(54) Title: FASTENING SYSTEM FOR REUSABLE DIAPER

(57) Abstract

The diaper pants fastening system with a changeable absorbent pad, wherein the diaper pants rear part is provided with an elastic hemming strip, as well as the diaper pants leg part is provided with an elastic edge and the front and rear parts are provided with the fastening system. The diaper pants (1) rear part (3) is provided with the hemming strip with an elastic element (13) only in a region closely adjacent the user's back, the rear part (3) is extended on both sides to the fastening projections (7) with round shapes, while the fastening projections (7) shape follows with the hemming strip with an elastic element (13), while the fastening projections (7) are provided on their periphery with a hemming strip (12) and with two button holes (8) inside for engaging the buttons (17) placed on the substrate strip (16) of the diaper pants (1) front part (2). In their leg parts, the diaper pants (1) are provided with the pants' hemming strip (12) sewn in portions (14) which are on the free parts, enclosing the user's legs, provided with an elastic edge (15).



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## FASTENING SYSTEM FOR REUSABLE DIAPER.

## Field of the invention

The solution relates to the fastening of the diaper pants onto the wearer's body. Owing to a fact the diaper pants with changeable pads are concerned, which are repeatedly used, it is necessary for the fastening system to be providing, even after repeated closures, sufficient tensile strength and elasticity at the same time for not to be too tight or slack for its user. In particular, the proposed fastening system is destined for the baby diaper pants.

## Background of the invention

Nowadays a great number of the diaper pants fastening systems have been known and used. The individual fastening systems application depends on what kind of diaper pants they are applied to. The fastening systems consist of an elastic edge encircling the user's waist and legs while this system remains substantially the same both for the disposable and for the repeated application pants. It deals with rubbers or elastic bands or strips location in the mentioned parts of the diaper pants. The fastening system further part is connecting the diaper pants front and rear parts in a manner they are secured around the user's waist. This part of the diaper pants fastening system depends on their type. The disposable diaper pants use a system of adhesive or self-adhesive strips and bands, wherein the system closure can not be repeated. Furthermore, the hook

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gripping systems, generally known as "VELCRO", have been used as the disposable pants fastening system. These hook systems may also serve even for the repeated diaper pants closing.

In order to connect the front and rear parts of the diaper pants for repeated application there have been used, e.g., fastening tapes, mechanical buttons, hooks, clasps, buttons and hook gripping components.

It is not appropriate for the diaper pants with a changeable pad to use the fastening systems of the disposable diaper pants like adhesive or self-adhesive tapes, as such closure can not be applied repeatedly. Applying fastening tapes does not seem to be too convenient as well, although being simple there exists a real risk of the tapes get knotted or broken. Mechanical buttons application is limited by their attachment to the pants substrate which is mostly a thin one with one layer being a liquid impermeable film into which an opening has to be formed while fastening the mechanical buttons. During repeated closing the mechanical buttons are subjected to tensile forces, whereby stressing the substrate and pulling the mechanical button out of the diaper pants substrate occurs.

Applying clasps and hooks may lead to spontaneous loosening, thus a failure of the fastening system.

The application of the hook components system is not too appropriate as well, as under repeated closing the hook surfaces become damaged and such systems are not sufficiently strong under tension and during their straining by tensile forces their unfastening might occur.

The cheapest and most suitable fastening system kind is the buttons application according to a designed solution combined with respective portions location in the crotch region of the diaper pants as is also described by the

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proposed solution. Such a system is sufficiently resistant to spontaneous unfastening or loosening, with no occurrence of knots or pulling the buttons out of the diaper pants substrate, as the tensile forces during unfastening are not so great as in the case of mechanical buttons. The system can be applied even repeatedly with handling being very simple and fast, the simple and fast being also the implementation of the system during production.

#### Summary of the invention

The invention relates to the diaper pants fastening system with a changeable absorbent pad, wherein the diaper pants rear part is provided with an elastic hemming strip, as well as the diaper pants leg part is provided with an elastic edge and the front and rear parts are provided with the fastening system. The diaper pants rear part is provided with the hemming strip with an elastic element only in a region closely adjacent the user's back, the rear part is extended on both sides to the fastening projections with round shapes, while the fastening projections shape follows with the rear part hemming strip with an elastic element, while the fastening projections are provided on their periphery with a hemming strip and with two button holes inside for engaging the buttons placed on the substrate strip of the diaper pants front part. In their leg parts the diaper pants are provided with to the pants hemming strip sewn in portions which are on the free parts, encircling the user's legs, provided with an elastic edge.

The fastening projections are formed with four material layers which, starting from the diaper pants front side, are: the first textile layer with hydrophile fibres, the second layer of a thin liquid impervious film, the

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substrate layer from a woven material, and the fourth layer the material of which is the same as the first textile layer material.

The substrate strip is placed over the front part whole width and is attached only on the first textile layer from hydrophile fibres, while the substrate strip is placed in parallel with the front part periphery hemming strip and under this periphery hemming strip.

In the hemming strip with an elastic element in the rear part and in the hemming strip of the front part in the diaper pants back the bands of material are placed being the same as the first textile layer material, while the bands are on their free edge provided with a hemming strip and the bands form a pocket for inserting and retaining changeable absorbent pads.

#### Review of the drawings

- Fig. 1 - shows a front perspective view of the diaper pants fastening system in a closed condition.
- Fig. 2 - shows the diaper pants front side in a flat-out state.
- Fig. 3 - shows the diaper pants rear side in a flat-out state.
- Fig. 4 - shows a sectional view of the diaper pants crotch part.
- Fig. 5 - shows a sectional view of the fastening projection.

#### Exemplary embodiment description

The diaper pants 1 with a changeable absorbent pad

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consists of two material layers. The layers are cut out to a respective shape, see Fig. 2. The first textile layer 9 is from a thin hydrophile material and forms a front 6 of the diaper pants 1. The second layer 10 is a thin liquid impervious film forming a rear 5 of the diaper pants 1. The first layer 9 is placed on the second layer 10 and they are bordered with a hemming strip 12 of a fine knitted fabric from synthetic, above all hydrophile fibres.

Into the crotch region, directly to the hemming strip 12 around the pants leg part a portion 14 is sewn in, the free part of which adjacent to the user's leg is provided with an elastic edge 15. These portions 14 are located in both leg portions and their elastic edge 15 prevents from side leakage of not sufficiently fast absorbed liquids or other exsudates, thus preventing wetting or soiling of babies undergarments. The portion 14 is formed with the same material as the second layer 10, thus from a thin liquid impervious film.

The diaper pants 1 consists of a front part 2 adjacent the user's belly and of a rear part 3 adjacent the user's back, both parts forming one entity.

The rear part 3 is in a place adjacent in the waist the user's back provided with a hemming strip with an elastic element 13. This hemming strip with the elastic element 13 is sewn in only in a region closely adjacent the user's back. The hemming strip with the elastic element 13 is applied only in the rear part 3 described place and nowhere else around the whole diaper pants 1 periphery.

The rear part 3 of the diaper pants 1 is further provided with fastening projections 7 which have no elastic edge. As Fig. 4 shows the fastening projections 7 are formed with four material layers, thus the first textile layer 9, the second layer 10 of an impervious film, the substrate material 11, for example from a woven material, and with

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another layer the material of which is the same as the first textile layer 9 material. There are at least two button holes 8 formed in the fastening projections 7 for attachment to the diaper pants 1 front part 2.

The diaper pants 1 front part 2 is provided over its whole width with a substrate strip 16 sewn onto the rear of the first textile layer 9 only so that the second layer 10 of the film is preserved a compact one and maintaining its liquid impermeability. In the substrate strip 16 location, symmetrically along the pants longitudinal axis, the diaper pants 1 front part 2 is provided with one button 17 on each side for engaging the button holes 8 of the fastening projections 7 of the diaper pants 1 rear part 3.

The rear 5 of the diaper pants 1 with a changeable pad is provided with bands 18 placed over the whole width of both rear 3 and front 2 parts and these bands 18 form pockets 19 for inserting and retaining changeable absorbent pads. The bands 18 are of the same material as the first textile layer 9. The bands 18 are sewn into the edge adjacent the user's waist and the bands 18 free edge is bordered with the hemming strip 12 without an elastic element being from the same material as the edge of the whole diaper pants 1.

The gripping system of the diaper pants with a changeable pad is a very simple one with a fast exchange of absorbent pads and the fastening system secures sufficient strength and elasticity and eliminates spontaneous unfastening. The portion placed in the pants leg part tightly but in an elastic manner encloses the user's leg, thus preventing leakage of unabsorbed exsudates.



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## C l a i m s

1. The diaper pants fastening system with a changeable absorbent pad, wherein the diaper pants rear part is provided with an elastic hemming strip, as well as the diaper pants leg part is provided with an elastic edge and the front and rear parts are provided with the fastening system characterized in that the diaper pants /1/ rear part /3/ is provided with the hemming strip with an elastic element /13/ only in a region closely adjacent the user's back, the rear part /3/ is extended on both sides to the fastening projections /7/ with round shapes, while the fastening projections /7/ shape follows with the hemming strip with an elastic element /13/, while the fastening projections /7/ are provided on their periphery with a hemming strip /12/ and with two button holes /8/ inside for engaging the buttons /17/ placed on the substrate strip /16/ of the diaper pants /1/ front part /2/, in their leg parts the diaper pants /1/ are provided with to the pants hemming strip /12/ sewn in portions /14/ which are on the free parts, enclosing the user's legs, provided with an elastic edge /15/.
2. The diaper pants fastening system according to claim 1, characterized in that the fastening projections /7/ are formed with four material layers which, starting from the diaper pants /1/ front /6/, are: the first textile layer /9/ with hydrophile fibres, the second layer /10/ of a thin liquid impervious film, the substrate material /11/ from a woven material, and the fourth layer the material of which is the same as the first textile layer /9/ material.

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3. The diaper pants fastening system according to claim 1, characterized in that the substrate strip /16/ is placed over the front part /2/ whole width and is attached only on the first textile layer /9/ from hydrophile fibres, while the substrate strip /16/ is placed in paralel with the front part /2/ periphery hemming strip /12/ and under this periphery hemming strip /12/.
4. The diaper pants fastening system according to claim 1, characterized in that in the hemming strip with an elastic element /13/ in the rear part /3/ and in the hemming strip /12/ of the front part /2/ in the diaper pants back /5/ the bands /18/ of material are placed being the same as the first textile layer /9/ material, while the bands /18/ are on their free edge provided with a hemming strip /12/ and the bands /18/ form pockets /19/ for inserting and retaining changeable absorbent pads.

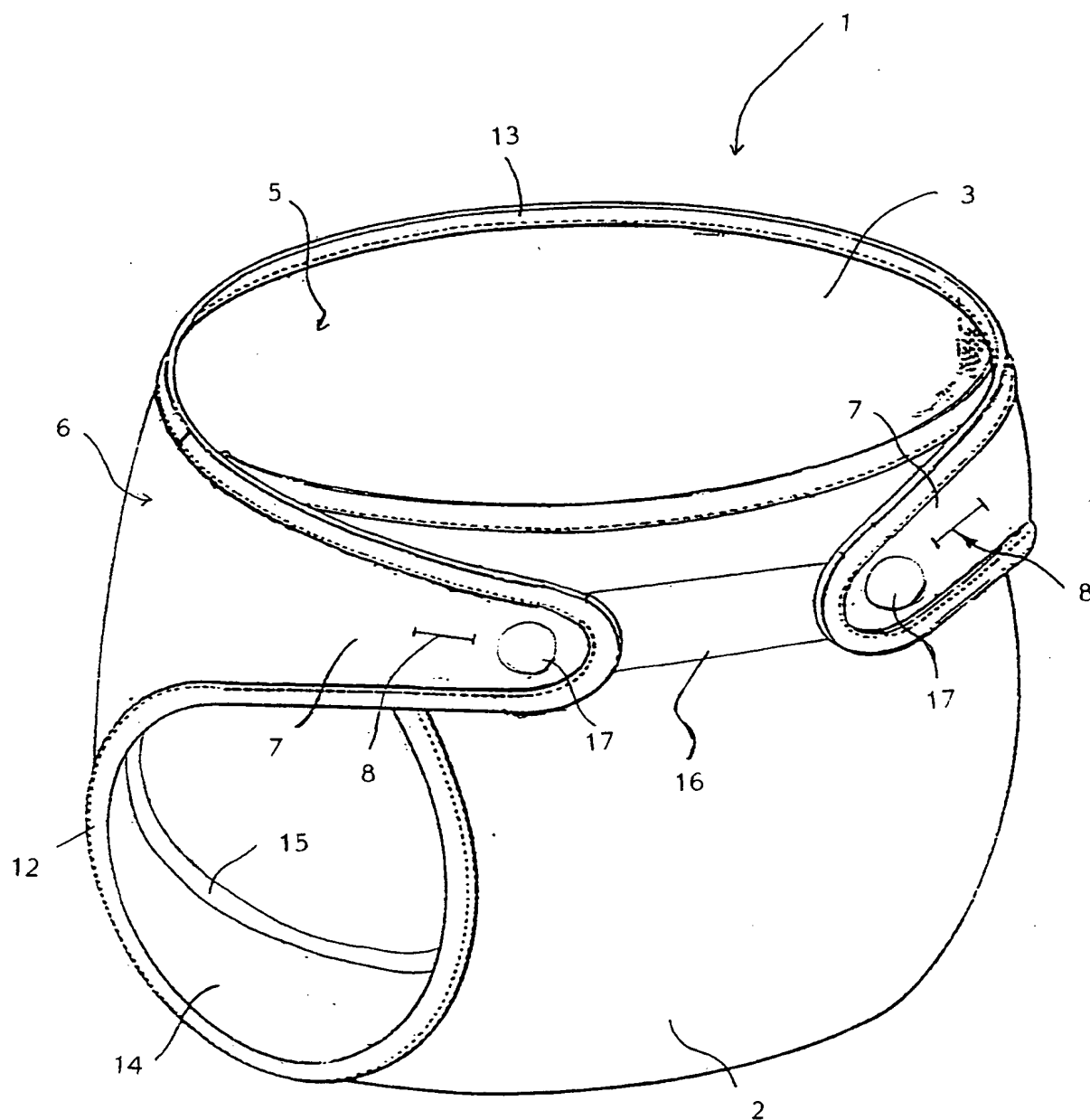


FIG. 1

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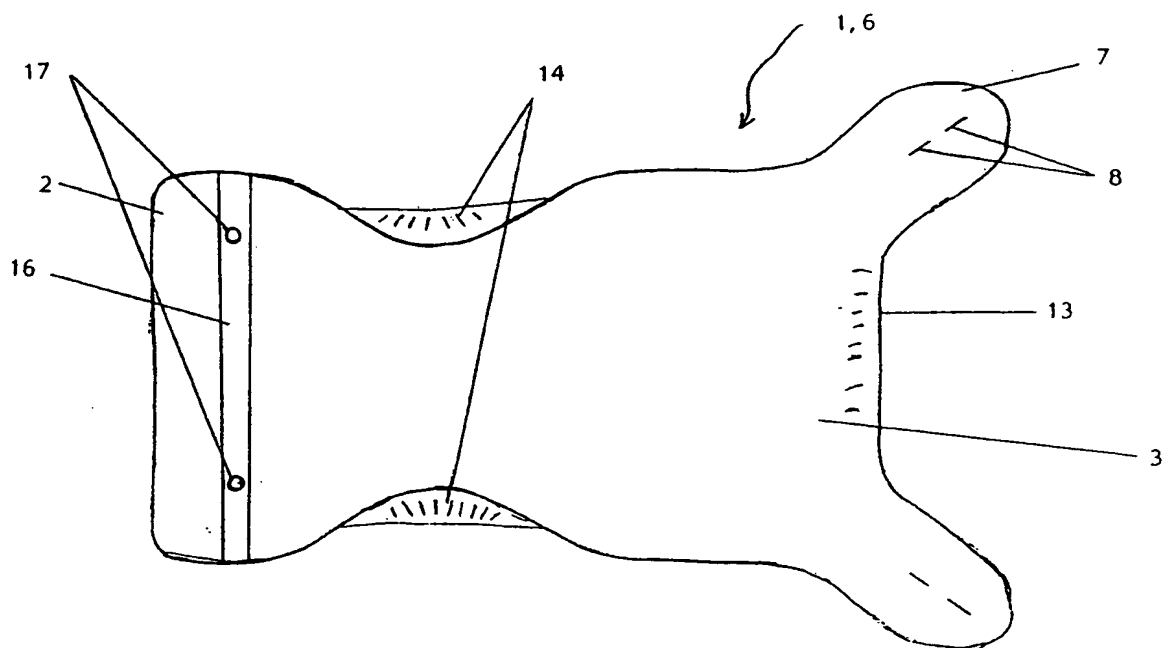


FIG. 2

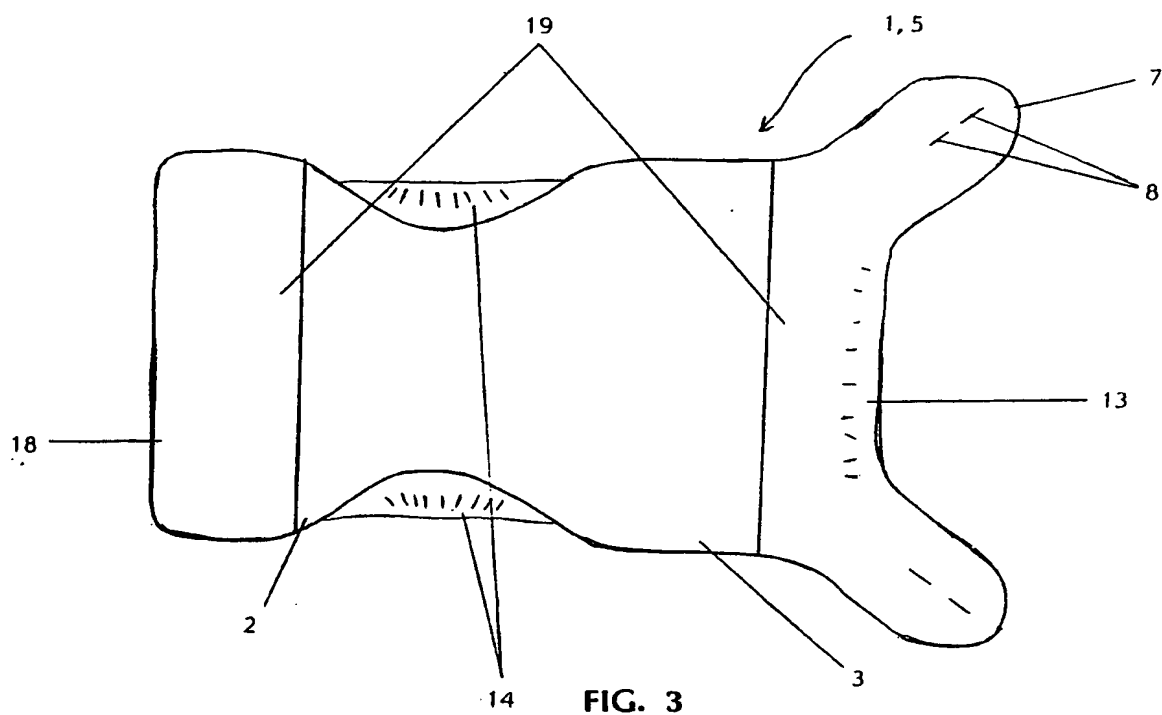


FIG. 3

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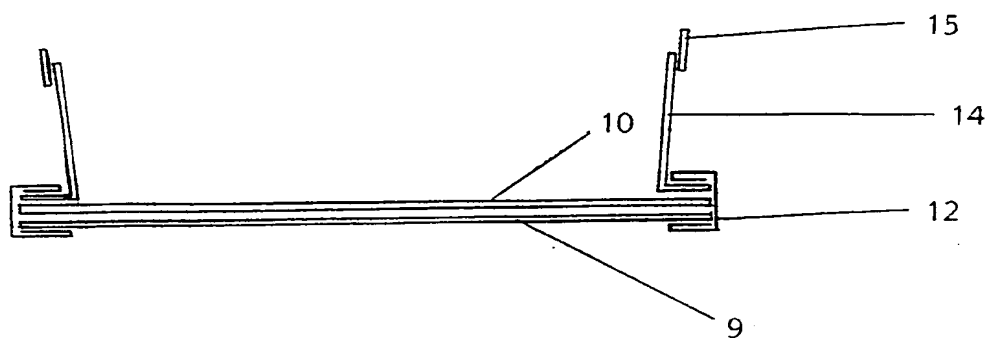


FIG. 4

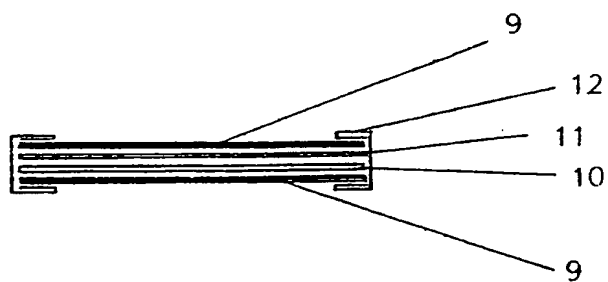


FIG. 5

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/CZ 98/00020

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 A61F13/15 A61F13/66

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 A61F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 342 340 A (STRUBLE CHRISTOPHER G ET AL) 30 August 1994 see abstract see column 2, line 28 - column 3, line 59; figures	1-4
X	US 2 558 215 A (HABIG ET AL) 26 June 1951 see the whole document	1-4
A	US 1 669 188 A (CONDYLIS) 8 May 1928	
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# INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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